

NON-PUBLIC?: N
ACCESSION #: 8910160019
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Braidwood 2 PAGE: 1 OF 3

DOCKET NUMBER: 05000457

TITLE: Reactor Trip As a Result of Lightning Induced Voltage Transient
EVENT DATE: 09/07/89 LER #: 89-004-00 REPORT DATE: 10/03/89

OTHER FACILITIES INVOLVED: NONE DOCKET NO: 05000

OPERATING MODE: 1 POWER LEVEL: 899

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR
SECTION:
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: David R. Lawson, Technical Staff Engineer Ext. 2492

TELEPHONE: 815-458-2801

COMPONENT FAILURE DESCRIPTION:
CAUSE: SYSTEM: COMPONENT: MANUFACTURER:
REPORTABLE NPRDS:

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

At approximately 2000 hours, September 7, 1989 a severe thunderstorm was in the area of Braidwood Station. A video recorder had been set up to monitor the effects of atmospheric events. From 2029 to 2036 sixty-three lightning flashes were recorded by the camera. Four of these lightning strikes hit station structures. The Unit 2 Auxiliary Building Vent Stack was struck twice. The Braidwood Station Switchyard was struck. At 2031:44 the Unit 2 containment was struck. At 2032 all ten Rod Control System (RD) Power Cabinet overvoltage Protection devices actuated. This caused the stationary gripper coils of the control rods to deenergize and the rods dropped into the core. The rapid flux decrease was sensed by the nuclear instrumentation which generated a Power Range fluxrate High Reactor Trip. The Reactor Trip Breakers opened, the Turbine tripped, and Feedwater Isolation occurred. The shrink effect on Steam Generator Level instrumentation resulted in an auto start of the Auxiliary Feedwater

pumps on low water level. The cause of this event was a lightning induced voltage transient. The RD overvoltage protection devices were reset. The RD system was tested. A time delay has been added to the overvoltage protection devices. Recommendations on additional corrective measures are being evaluated. There have been two previous occurrences. Previous corrective actions were not applicable.

END OF ABSTRACT

TEXT PAGE 2 OF 3

A. PLANT CONDITIONS PRIOR TO EVENT:

Unit: Braidwood 2; Event Date: September 7, 1989; Event Time: 2033;

Mode: - 1; Power Operation; Rx Power: 100%;

RCS AB! Temperature/Pressure: NOT/NOP

B. DESCRIPTION OF EVENT:

There were no systems or components inoperable at the beginning of the event which contributed to the severity of the event.

At approximately 2000 hours, September 7, 1989 a severe thunderstorm was in the area of Braidwood Nuclear Generating Station. A video camera connected to a video cassette recorder had been set up to monitor the effects of atmospheric events on station structures. The camera and recorder were in operation for this event.

From 2029 to 2036 sixty-three lightning flashes were recorded by the camera. Four of these lightning strikes have been identified as striking station structures.

At 2030 the Unit 2 Auxiliary Building Vent Stack was hit.

At 2031:09 the Unit 2 Auxiliary Building Vent Stack was hit for a second time.

At 2031:44 one of the Lightning rods on the Unit 2 containment was struck by Lightning.

At 2032, a Rod Control Urgent alarm occurred. This was due to the actuation of all ten Rod Control system (RD) (AA) Power Cabinet Positive Low Voltage Power Supply Overvoltage Protection devices. This caused a loss of control power to the Rod Drive control cards.

On the loss of control power the stationary gripper coils of the control rods deenergize causing the rods to insert into the core as designed. The rapid Neutron Flux decrease was sensed by the Power Range Nuclear Instrumentation (NI) IG! which generated a Power Range Fluxrate High Reactor Trip. The Reactor Trip Breakers opened, the Turbine tripped, and Feedwater Isolation occurred as designed. Numerous spurious alarms were received but immediately cleared. These were attributed to the voltage transient.

The rapid reduction in the steam flow from the Turbine Trip caused a shrink effect on Steam Generator level instrumentation. This resulted in an auto start of the Auxiliary Feedwater BA! pumps on indicated Low Steam Generator Water Level as anticipated. Stable plant conditions were established. Operator actions neither increased nor decreased the severity of this event.

At 2245 the appropriate notification via the ENS phone system was made pursuant to 10CFR50.72(b)(2)(ii).

This event is being reported pursuant to 10CFR50.73(a)(2)(iv) - any event or condition that resulted in manual or automatic actuation of any Engineered Safety Feature, including the Reactor Protection System.

TEXT PAGE 3 OF 3

C. CAUSE OF EVENT:

The root cause of this event was a voltage transient. It is believed that the lightning that struck the Unit 2 Containment caused a voltage surge in the station ground system. This caused a sudden voltage surge in the RD power supplies which actuated the RD overvoltage protection and caused the Control Rod stationary gripper coils to deenergize.

D. SAFETY ANALYSIS:

This event had no effect on the safety of the plant or the public. All systems operated as designed. Both trains of Reactor Protection and ESF were operable and performed their functions as designed.

The worst case condition is a Unit operating at 100% power with a Rod Control failure. The Rod Control system is designed to be inherently safe as rod insertion results on loss of power as was the case in this event.

E. CORRECTIVE ACTIONS:

The Rod Control System Power Cabinet Positive Low Voltage Power Supply Overvoltage Protection devices were reset. The RD system was tested by withdrawing each bank of rods 12 steps and then reinserting the bank. During the performance of this test a fuse in one of the power cabinets was found to be blown. The fuse was replaced. All rods performed satisfactorily.

A time delay has been added to the overvoltage protection devices for the RD Power Cabinet Positive Low Voltage Power Supplies on Unit 1 and Unit 2.

A lightning arrestor consultant has made recommendations on additional corrective measures for the station. These recommendations are being evaluated for applicability. This will be tracked to completion by action item 457-200-89-07501.

F. PREVIOUS OCCURRENCES:

There have been two previous occurrences of Reactor trip from lightning induced voltage transients affecting the Rod Control system.

DVR Number Title

20-1-88-240/88-023 Instrument Failures on Unit 1 and Reactor Docket 456 Trip on Unit 2 from Lightning Induced Voltage Transients.

20-1-89-104/89-006 Unit 1 and Unit 2 Reactor Trip as a Result of Lightning Induced Voltage Transient Affecting Rod Control System.

Previous corrective actions are not applicable to this event.

G. COMPONENT FAILURE DATA:

The event was not the result of component failure, nor did any components fail as a result of this event.

ATTACHMENT 1 TO 891016019 PAGE 1 OF 1

Commonwealth Edison
Braidwood Nuclear Power Station
Route #1, Box 84

Braceville, IL Illinois 60407
Telephone 815/458-2801

October 6, 1989
BW/89-1173

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Dear Sir:

The enclosed Licensee Event Report from Braidwood Generating Station is being transmitted to you in accordance with the requirements of 10CFR50.73(a)(2)(iv) which requires a 30 day written report.

This report is number 89-004-00; Docket No. 50-457.

Very truly yours,

R. E. Querio
Station Manager
Braidwood Nuclear Station

REQ/AJS/jfe
(7126z)

Enclosure: Licensee Event Report No. 89-004-00

cc: NRC Region III Administrator
NRC Resident Inspector
INPO Record Center
CECo Distribution List

*** END OF DOCUMENT ***
